Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2023-0093, **File Type:** Motion / Motion Response **Agenda Number:** 2.

ADVANCED TRANSIT VEHICLE CONSORTIUM
MARCH 22, 2023

SUBJECT: ORAL REPORT ON ZEB MASTER PLAN UPDATE

ACTION: ORAL REPORT

RECOMMENDATION

RECEIVE oral report on ZEB Master Plan Update.

EQUITY PLATFORM

Operations collaborates with the Office of Equity and Race to identify and mitigate any concerns to ensure equitable outcomes relative to service.

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Stephanie N. Wiggins
Chief Executive Officer

ZEB Master Plan Update

Advanced Transit Vehicle Consortium (ATVC) Board Briefing

March 2023

Contents

- BACKGROUND
- ACHIEVEMENTS
- LESSONS LEARNED
- CHALLENGES
- ZEB FUNDING SECURED TO DATE
- NEXT STEPS

California Innovative Clean Transit (ICT) Regulation

- Adopted in December 2018
- Requires all public transit agencies to gradually transition to a 100 percent zero-emission bus (ZEB) fleet.
- Beginning in 2029, 100% of new purchases by transit agencies must be ZEBs, with a goal for full transition by 2040.
- A ZEB Rollout Plan is required from each transit agency, approved by its Board, to show how it is planning to achieve a full transition to zero-emission technologies by 2040.

Source: California Air Resources Board

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Metro's ZEB Board Resolution

File #: 2017-0525

REVISED
REGULAR BOARD MEETING
JULY 27, 2017

Motion by:

DIRECTORS BONIN, GARCETTI, NAJARIAN, HAHN and SOLIS
AS AMENDED BY SOLIS, KUEHL and BARGER

FRIENDLY AMENDMENT BY FASANA

July 27, 2017

Strategic Plan for Metro's Transition to Zero Emission Buses

LA Metro has developed a comprehensive plan to deliver a complete transition to zero emission electric buses by 2030. The transition plan is contingent on two primary factors: continuous advancements in electric bus technology (which must increase range, reduce bus weights, reduce charging times, extend battery life cycles), as well as a drop in prices as the technology develops.

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G Line Electrification

- January 2021 – Start of 100% Electrified Service
- 40 New Flyer Xcelsior artics (320kWh battery capacity)
- 3 million miles accumulated
- En-Route Charging
  - Opportunity chargers deployed at 3 locations on route
  - Four 450kWh and four 600kWh Siemens opportunity "fast" chargers
- Depot Charging
  - Ten 150kWh depot chargers also installed at D8

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J Line Service

Infrastructure In Progress – completion by Fall 2025:

- Design anticipate to be completed April 2023, construction complete by Fall 2025.
  - El Monte Transit Center (EMTC):
    - 4 Opportunity (450kWh) chargers
  - Division 9:
    - 125 depot chargers (40 x 150kWh chargers for 120 parking spots)
    - 3 "Fuel Lane" rapid chargers (450 kWh) + 2 portable units
- Harbor Gateway Transit Center (HGTC):
  - 5 Opportunity chargers
  - Construction starts in April 2023, provisions for charging masts complete by Fall 2023
- Division 18:
  - 71 depot chargers for 223 parking spots
  - 5 rapid chargers
  - 60% Design completed, anticipate Design Build procurement to be issued Summer 2023

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J Line Service - Buses

Ordered:

- 100 40-foot Buses Ordered from BYD (K9M)
- 5 60-foot Articulated Buses Ordered from BYD (K11M)

Deployed:

- 4 40-foot BEBs (BYD K9M) currently in service
- 1 40-foot BEB (BYD K9M) scheduled for deployment Summer 2023
- 5 60-foot BEBs (BYD K11M) articulated buses scheduled for deployment Summer 2023

Pending Delivery

- 95 40-foot BEBs (BYD K9MD) scheduled for delivery Winter 2023 through Winter 2024

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J Line Service

Temporary Chargers – 2023 through 2025

- Acquisition planning for temporary chargers under development
  - Target deployment date Fall 2023
- Limited Service Currently Underway
  - 4 40-foot BYD K9M buses
- Projected Service
  - 1 additional 40-foot BYD K9M bus by Summer 2023
  - 5 60-foot BYD K11M buses by Summer 2023
  - 95 additional 40-foot BYD K9MD buses starting delivery in Winter 2023 to Winter 2024

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Other Accomplishments

- 145 BEBs ordered: one of largest BEB procurements to date in CA/USA.
- 44 BEBs in service, and by end of 2023, largest BEB fleet in US
- In January 2023, the Metro Board authorized RFP for procurement of up to 1,000 more BEBs and associated charging infrastructure
- $413.1 million in additional ZEB-related federal and state grant funding to date, including one of the largest Low-Emission/No-Emission grants in this federal program's history ($104.1 million awarded in 2022)
- Significant investments in workforce development including $4.96 million in grant funding for training
- Incorporate Manufacturing careers policy and advanced BEB training for operators and maintainers

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Funding Secured to Date

GRANT TYPE	AMOUNT	PURPOSE	SCHEDULE			
			Original Award	Allocate By	Award a Contract by	Fully Spent By
STIP-RIP	19,132,000	buses & charging infrastructure	12/19/2019	6/30/2023	12/30/2023	12/30/2026
STIP-RIP	17,096,000	buses		6/30/2023	6/30/2024	6/30/2027
STP-RIP	500,000	charging infrastructure		6/30/2024	12/31/2024	12/31/2027
STIP-RIP	40,749,000	buses		6/30/2025	12/31/2025	12/31/2028
CRRSAA-STIP	38,189,000	charging infrastructure		6/30/2023	12/31/2023	12/31/2026
TIRCP	159,100,000	Div 9/18/J Line buses & charging infrastructure	7/7/2022	6/30/2025	12/31/2025	12/31/2028
LCTOP	39,098,039	Charging Infrastructure	7/1/2020			
FTA LoNo	104,200,000	Div 9/18 buses & charging infrastructure. $4.96 mil. workforce development set-aside at post-completion.	8/15/2022	9/30/2025		
ALL GRANTS	413,064,039					

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Technology Lessons Learned

Technology Still Nascent – And Expensive

- ZEBs and Charging Equipment sensitive to heat/overtemperature
- Diagnostic tools for failure investigations not mature

Technical Support Is Not Local

- Most expertise is abroad
- Response times are long

Electric Grid Is Fragile

- Risk of black/brown-outs during high energy usage
- Utilities under pressure

Technical Challenges to Meeting 2030 Goal

Challenges

- Performance
- Utility/Grid
- Costs

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Performance Challenges

- Range issues from still immature technology, requiring more buses or opportunity chargers
- Potential cost overruns due to earlier adoption (more buses, more infrastructure)

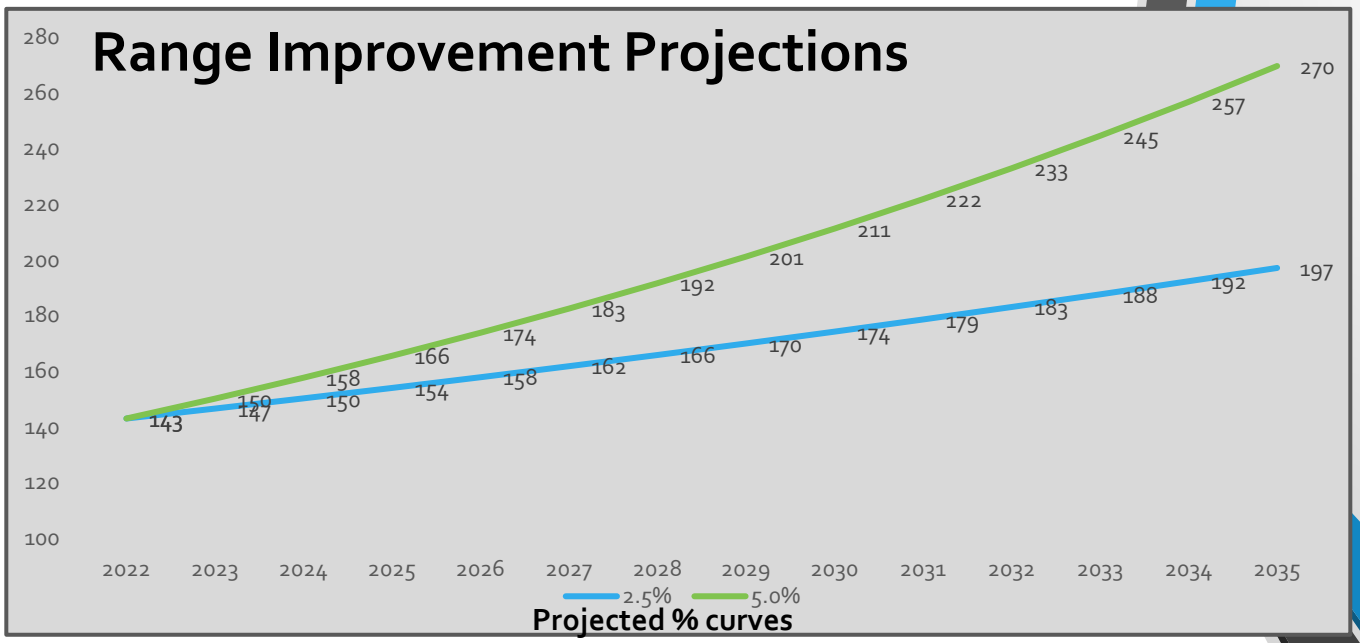
Performance in 2020's remains insufficiently developed

Performance Challenges

Technology Advancement in relation to a 2035 Transition:

- As BEB range improves, Metro will come close to parity with CNG – resulting in fewer opportunity chargers
- 2035 allows for more time for needed LADWP/SCE improvements
- Supply chain, labor and technical support issues should abate by 2035

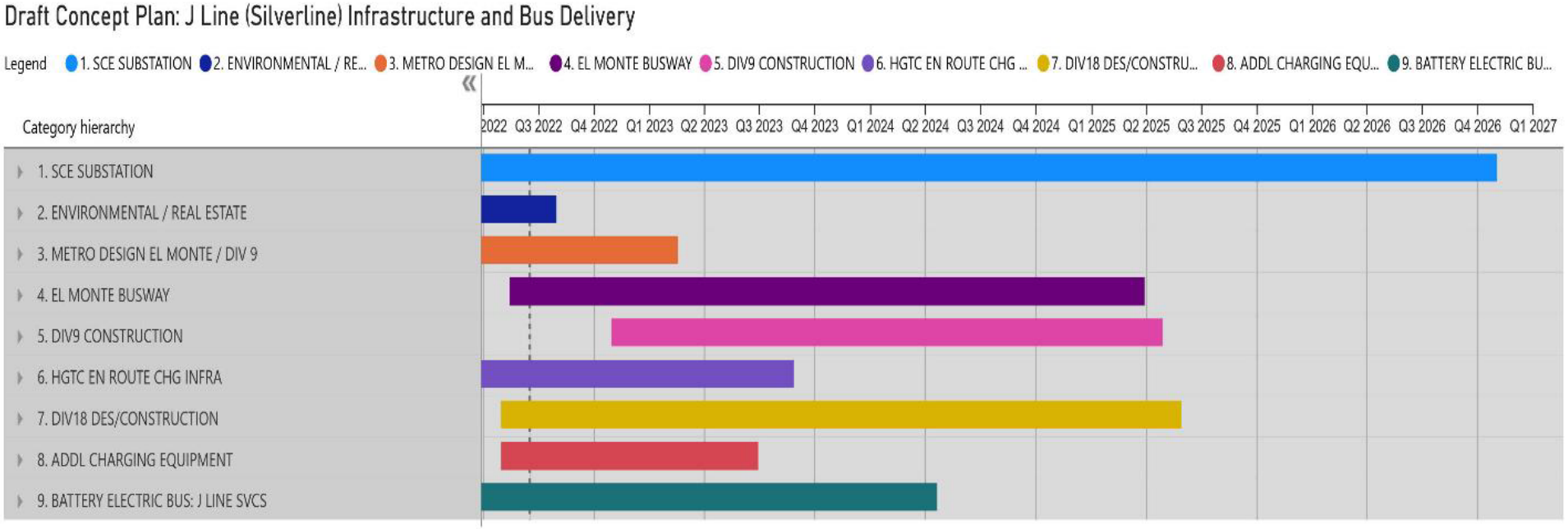
Post-2030 Technology Improvement Trends Affords Future Program Opportunities



Utility/Grid Challenges

- Grid Capacity is limited, additional capacity requires 3-7 years
- Grid is fragile – frequent brown/blackouts, resilience strategies under development

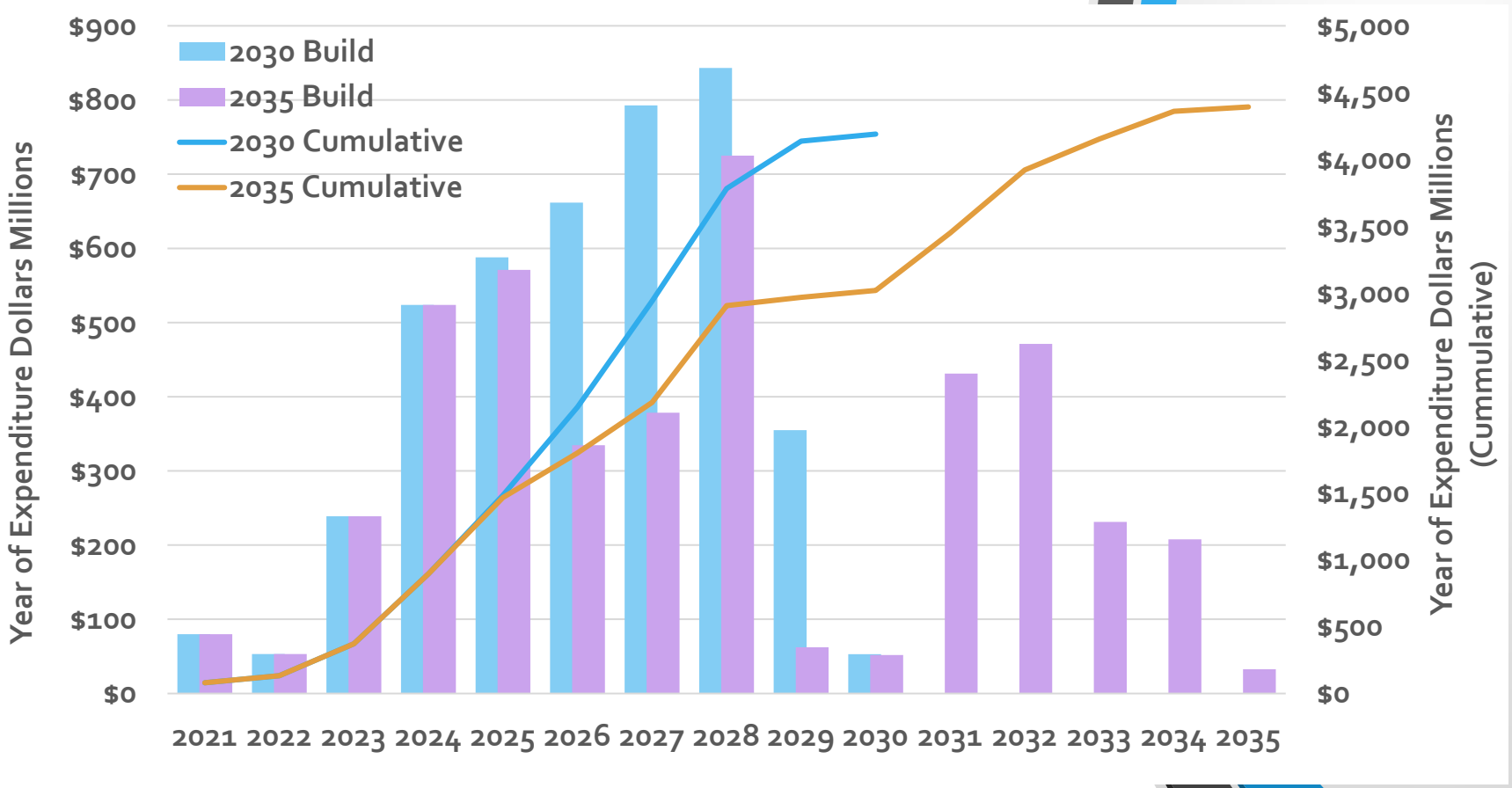
Utility / Grid Improvements



Cost Challenges

2030 and 2035 – Cashflow Differences

Capital Costs



Cost Challenges

Annual Capital Costs – 2030 versus 2035

Program Capital Expenditures (YOE millions)	2030 Goal	2035 Goal
Vehicle Purchase Price	$2,996	$3,145
Modifications & Contingency	$363	$381
Charging/Fueling Infrastructure	$830	$867
Total Capital Costs	**$4,189**	**$4,392**
Average Annual Capital Costs	**$598**	**$366**

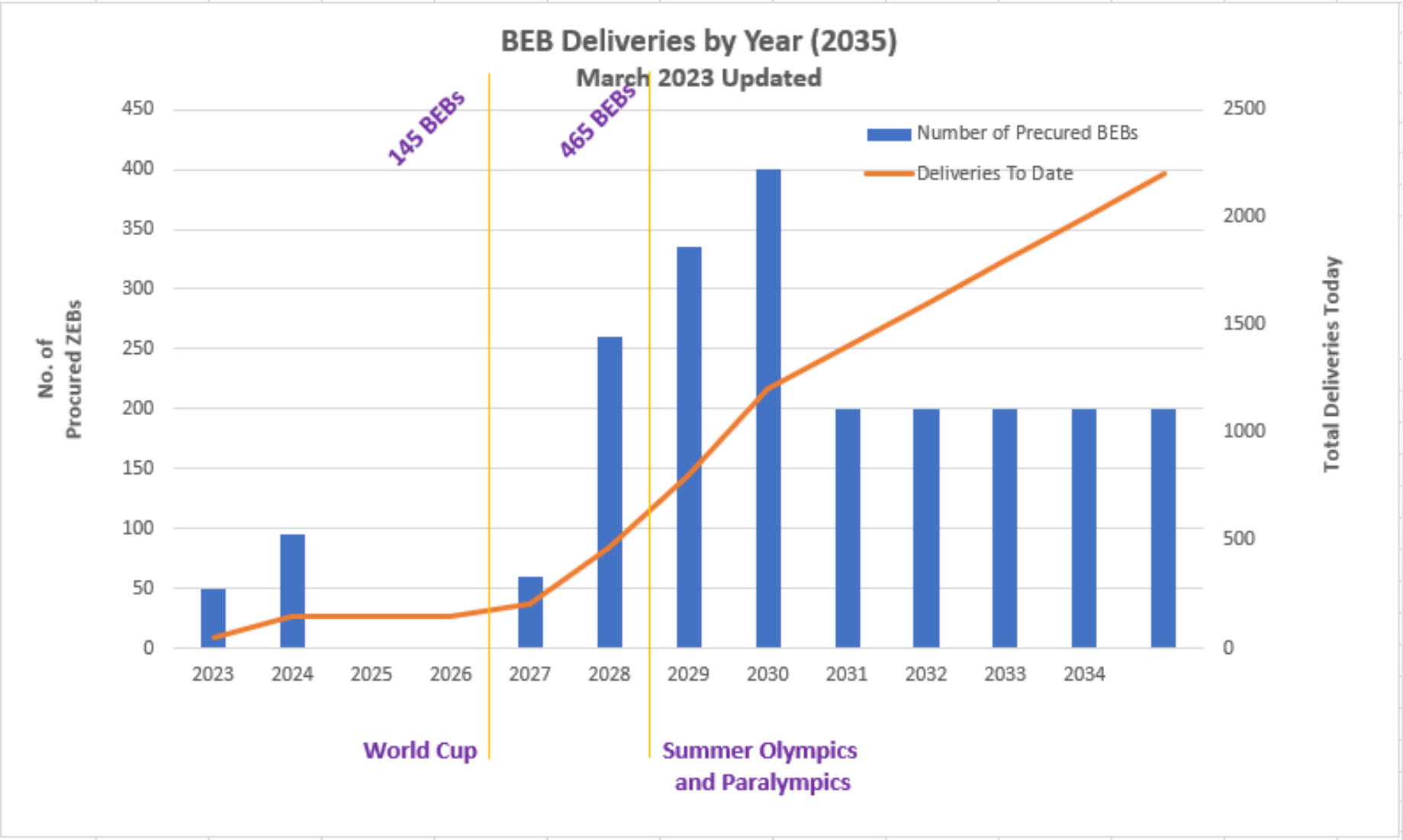
Summary

An additional five transition years:

- Gives utilities additional upgrades time to ensure Metro has needed grid capacity and reliability at divisions
- Better capitalizes on technological advancement
  - Potential cost savings due to a reduced need for infrastructure
  - Savings could be as high as $119 million based on preliminary analysis
- Lower average annual capital cost

Summary

Summary



- Worldcup estimate of Bus availability is 145 Buses
- Olympics estimate of Bus Availability is 365-465 Buses

NEXT STEPS

- New Solicitation for ZEB's & Chargers
- Collaboration with OSI on Alternative Delivery Method

DISCUSSION

Questions?